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TECH CENTER 1600/2800

REMARKS

The applicants appreciate the Examiner's thorough examination of the Application and request reexamination and reconsideration of the Application in view of the following remarks.

The USPTO allowed all pending claims in the subject application in a Notice of Allowance dated January 13, 2003. Applicants submitted the Issue Fee on February 12, 2003. On March 19, 2004, the USPTO mailed a Notice of Withdrawal from Issue under 37 CFR 1.313(b) and subsequently mailed an Office Action on March 31, 2004 to which this communication is responsive.

The Examiner states that claims 5, 8, 20, 21 and 23 have been withdrawn from consideration. However, claim 20 is still pending and has not been withdrawn from consideration since it was allowed in the Notice of Allowance dated January 13, 2003.

Claims 1, 2, 4, 6, 7, 9-10, 12, 14-16, 18, and 22 stand rejected under 35 USC §102(b) as allegedly being anticipated by U.S. Patent No. 4,861,643 to Scollard.

The subject invention results from the realization that the transverse strength of a composite structure can be increased by translaminar reinforcement of the composite structure including fibers disposed through the thickness of the structure, and further that the strength of a joint between two such reinforced composite structures can be achieved by leaving the translaminar reinforcing fibers exposed at the surface of the structure at the joint region and then flowing a braze or other adherent material into the joint region and about the exposed fibers, and the further realization that in some cases the adherent material can be urged partially along the length of the reinforcing fibers and into each structure thereby providing a more cohesive bond at the joint region.

Scollard shows an aerospace structure that includes two elements having mutually opposed surfaces, between which a void filler is placed. Filler is placed between the elements when they are placed in tool 24, shown in Fig. 2 of Scollard. Once the filler has cured, the aerospace structure is removed from tool 24 and excess cured filler can be milled with appropriate milling tools. As noted at column 4, lines 62-64, only after the void filler has cured, “rivet holes can be drilled or otherwise formed adjacent the trailing end of the structure.” Rivets may afterwards be placed in the rivet holes.

Scollard does not disclose or suggest, however, what the application claims: disposing an adherent into a joint region and about interstitially arranged reinforcing elements disposed through the thickness of each part.

In contrast to Scollard et al., claim 1 of the subject application recites: “[a] method of joining composite parts comprising: disposing a plurality of extrinsic reinforcing elements each extending through the thickness of two composite adherends to be joined, at least a number of said reinforcing elements extending from the joint surface of each said adherend; assembling said adherends so that the joint surface of one said adherend faces the joint surface of the other said adherend defining a joint region therebetween, said extending reinforcing elements interstitially disposed in said joint region; and disposing an adherent within said joint region about said interstitially disposed reinforcing elements and said joint surfaces.” (Emphasis added.) Scollard does not disclose or suggest disposing an adherent within said joint region about said interstitially reinforcing elements and said joint surfaces. Independent claims 9, 12, 20, 22 and 24 each recite similar features that clearly distinguish over Scollard.

Also in contrast to Scollard et al., claim 16 of the subject application recites: “[a]

method of joining composite parts comprising: inserting, through the thickness of each said composite part, a plurality of extrinsic reinforcing elements extending from the joint surface thereof; selecting an adherent interlayer material for joining said parts; assembling said composite parts such that said joint surfaces face each other with said adherent interlayer therebetween; driving said reinforcing elements into said adherent interlayer and curing said interlayer locking said reinforcing elements therein.” (Emphasis added.) Scollard does not disclose or suggest driving reinforcing elements into an adherent interlayer and curing said interlayer locking the reinforcing elements therein. Claim 18 also recites similar features that clearly distinguish over Scollard et al.

Also in contrast to Scollard, claim 13 of the subject application recites: “[a] method of joining a composite part with a non-composite part comprising: inserting, through the thickness of said composite part, a plurality of reinforcing elements extending from the joint surface thereof; assembling said composite part such that said reinforcing elements are proximate the joint surface of said non-composite part; and brazing said joint surfaces and said reinforcing elements to form a joint.” (Emphasis added.) Scollard does not disclose or suggest brazing joint surfaces and reinforcing elements to form a joint. Independent claims 14, 15 and 19 recite similar features that also clearly distinguish over Scollard.

Also in contrast to Scollard et al., claim 6 of the subject application recites: “[a] method of joining composite parts comprising: disposing a plurality of extrinsic reinforcing elements each extending through the thickness of two composite adherends, said reinforcing elements extending from the joint surface of each said adherend; assembling said adherends so that the joint surface of one said adherend faces the joint surface of the other adherend; disposing an adherent interlayer between said opposing joint surfaces; urging said extending

reinforcing elements of each said adherend through said adherent interlayer and interstitially locking said reinforcing elements therein.” Scollard does not disclose or suggest disposing a plurality of extrinsic reinforcing elements each extending through the thickness of two composite adherends, the reinforcing elements extending from the joint surface of each adherend, and urging the extending reinforcing elements of each adherend through the adherent interlayer and interstitially locking the reinforcing elements therein. Claim 10 recites similar features that also clearly distinguish over Scollard.

Scollard shows placing filler between two elements and then placing a rivet through both elements. The subject invention as claimed, however, is markedly different than the disclosure of Scollard. The subject invention teaches using two sets of reinforcing elements - one set placed in one adherend and another set placed in another adherend. The reinforcing elements may be left exposed at the joint region between the adherends. The adherends are mated and an adherent is placed therebetween. The adherent may be either cured or glazed to provide a composite part having increased transverse strength. The claimed reinforcing elements perform two functions: 1) they reinforce the layers of each composite part; and 2) they add surface area for the adherent to bond which better locks the parts together. The rivets of Scollard do not provide additional surface area for an adherent since the rivets are inserted after the adherent has cured. As such, Scollard does not disclose or suggest the subject invention as claimed.

Accordingly, each of the independent claims stated above and the claims dependent therefrom are clearly patentable over Scollard. Applicants respectfully request that the Examiner withdraw these rejections.

Claims 3, 11, 13, 17, 19 and 24 stand rejected under 35 USC §103(a) as allegedly

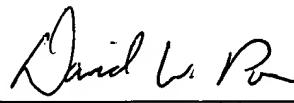
being unpatentable over Scollard in view of U.S. Patent No. 4,808,461 to Boyce.

The Examiner stated in the Office Action dated March 31, 2004 that “no adherent is added to the space between parts 56 and 58 [in Boyce et al.] when they are joined to part 60. Yet, a skilled artisan might be motivated to include an adherent as seen in ‘643 to fill in possible voids between the component parts.” However, no void is shown between component parts 60 and 56 or 60 and 58 in Fig. 8 to which the Examiner refers. One skilled in the art would not have motivation to use an adherent between these component parts because no need for adherent would appear to exist from reading the disclosure of Boyce et al. Thus, the Examiner’s combination of Boyce et al. and Scollard is improper because no teaching or motivation exists for combining these two references.

Additionally, independent claims 13 and 24 were addressed above with respect to the 35 USC §102(b) rejection and claims 3, 11, 17 and 19 are each dependent from one of the independent claims also addressed above. Accordingly, each of these claims are patentable for the reasons stated above and are further patentable since they include one or more additional features. Applicants respectfully request that the Examiner withdraw the rejections of claims under 35 USC §103(a).

If for any reason this Response is found to be incomplete, or if at any time it appears that a telephone conference with counsel would help advance prosecution, please telephone the undersigned or his associates, collect in Waltham, Massachusetts, at (781) 890-5678.

Respectfully submitted,

  
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